

7th Semester	RPR7D001	Product Design and Development	L-T-P 3-0-0	3 Credits
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Module I:**(12 hours)**

Introduction: Design theory, design materials, human factors in design, man-machine system, applied ergonomics, characteristics of successful product development, challenges to product development.

Development process and product planning: Generic development processes, Concept development, product development process flows, product planning process, identify customer needs.

Module II:**(12 hours)**

Product specifications and concept generation: Product specification, steps to establish the target specifications, Concept generation, five step concept generation method, concept selection, concept screening, concept testing, product architecture.

Product design methods: Creative and rational, clarifying objectives - the objective tree method, establishing functions- the function analysis method, setting requirements – the performance specification method, determining characteristics – the QFD method, generating alternatives - morphological chart method, evaluating alternatives - the weighted objective method, improving details - the value engineering method and design strategies.

Module III:**(12 hours)**

Design for manufacture: Estimating manufacturing cost, reducing component, assembly and support costs, design for assembly, design for disassembly, design for environment, design for graphics and packaging, effective prototyping - principle and planning.

Module IV:**(12 hours)**

Industrial design: Its need, impact and quality, industrial design process and its management, legal issues in product design, design resources, economics and management of product development.

Prototyping: Basics and principles of prototyping, prototyping technologies, planning for Prototypes.

Books:

- [1] K. T. Ulrich and S.D. Eppinger, "Product design and development", Tata McGraw Hill
- [2] Chitale & Gupta, "Product Development", Tata McGraw Hill
- [3] Monks, J. G., "Operations Management", McGraw Hill, 1997.
- [4] George Dietor, A material and Processing approach, McGraw Hill

Digital Learning Resources:

Course Name: Product Design and Development
 Course Link: <https://nptel.ac.in/courses/112/107/112107217/>
 Course Instructor: Prof. Indradeep Singh, IIT Roorkee